

REMARKS

Claims 1, 4 to 8, and 11 to 24 are now pending in the present application. In view of the following, it is respectfully submitted that all of the presently pending claims are allowable, and reconsideration is respectfully requested.

Applicants thank the Examiner for acknowledging the claim for foreign priority and that all certified copies of the priority documents were received.

The minor amendment to claim 1 only deletes a colon, and no substantive amendment is made. Approval and entry are respectfully requested.

Claims 1, 4 to 8, 11 to 24 were rejected under 35 U.S.C. § 103(a) as unpatentable over U.S. Patent 6,406,939 (“Lin”) in view of U.S. Patent Application 2003/0080392 (“Zuniga-Ortiz”) and U.S. Patent 6,372,539 (“Bayan”) in further view of U.S. Patent No. 5,849,170 (“Djokic”) or the Background Information (the characterization of the Background Information is not necessarily agreed with for purposes of this response).

To reject a claim under 35 U.S.C. § 103(a), the Office bears the initial burden of presenting a *prima facie* case of obviousness. *In re Rijckaert*, 9 F.3d 1531, 1532, 28 U.S.P.Q.2d 1955, 1956 (Fed. Cir. 1993). To establish *prima facie* obviousness, three criteria must be satisfied. First, there must be some suggestion or motivation to modify or combine reference teachings. *In re Fine*, 837 F.2d 1071, 5 U.S.P.Q.2d 1596 (Fed. Cir. 1988). This teaching or suggestion to make the claimed combination must be found in the prior art and not based on the application disclosure. *In re Vaeck*, 947 F.2d 488, 20 U.S.P.Q.2d 1438 (Fed. Cir. 1991).

Also, as clearly indicated by the Supreme Court in *KSR*, it is “important to identify a reason that would have prompted a person of ordinary skill in the relevant field to combine the [prior art] elements” in the manner claimed. *See KSR Int’l Co. v. Teleflex, Inc.*, 127 S. Ct. 1727 (2007). In this regard, the Supreme Court further noted that “rejections on obviousness cannot be sustained by mere conclusory statements; instead, there must be some

articulated reasoning with some rational underpinning to support the legal conclusion of obviousness.” *Id.*, at 1396. Second, there must be a reasonable expectation of success. *In re Merck & Co., Inc.*, 800 F.2d 1091, 231 U.S.P.Q. 375 (Fed. Cir. 1986). Third, the prior art reference(s) must teach or suggest all of the claim features. *In re Royka*, 490 F.2d 981, 180 U.S.P.Q. 580 (C.C.P.A. 1974).

It is believed and respectfully submitted that the Final Office Action’s assertions as to patentable activity are based on impermissibly general assumptions and unsupported possibilities for combining a plurality of unrelated references. In particular, it is believed and respectfully submitted that it is not properly possible in any way to connect technically the applied references. The conclusory assertions of the Final Office Action elude any proper basis of examination.

Claim 1 is directed to a method for producing a conductive layered coating on an insulating substrate, comprising: equipping, in selected regions, at least one surface of an electrically insulating substrate with a coating of an electrically highly conductive first metal, the coating being structured as conductor paths; structuring the first metal to cover locally the at least one surface of the substrate; cleaning the at least one coated surface; *seeding the coating with seeds of a second metal*; depositing a first layer including an alloy of the second metal onto the coating seeded with the seeds of the second metal; depositing a second continuous layer including the alloy of the second metal onto the coating seeded with the seeds of the second metal, the second continuous layer covering the first layer; firing the substrate deposited with the first and second layers of the second metal to form the conductive layered coating, the firing being performed so that the first metal is diffused with the second metal; and contacting a gold bonding wire to the conductive layered coating, wherein: the substrate includes a low-temperature co-fired ceramic (LTCC), the first metal includes silver, and the second metal includes palladium.

The Lin reference, whether taken alone or combined with any other applied reference, does not disclose the foregoing combination of features for the following reasons.

The presently claimed subject matter provides for the forming of circuit traces through a coating process using a first and a second coating material. In this context, the coating process itself does not involve contacting an electric component. For this purpose, a subsequent contacting method (bonding) separate from the coating process is necessary. Additionally, for the formed circuit traces to have the ability to contact, the presently claimed subject matter first requires a transformation, in terms of materials technology, of the coating materials through a firing operation (diffusion). Otherwise, a contacting would not be possible.

The Office Actions to date generally refers to the Lin reference. However, this reference only refers to the coating process of a via within a substrate. In this context, a connection is created between the coating material and the connector pad of a chip disposed on the substrate during the coating process already. Thus, the coating method itself also constitutes the contacting method. No circuit traces are formed in the via itself. Rather, the coating occurs on the side walls of the via of the substrate. The side walls are made up of the substrate material (see item 405 in Fig. 4A – 4E) or of a metallization (see item 307 in Fig. 3A-3D; item 508 in Fig. 5A-5E, item 607 in Fig. 6A-6D).

In this context, the metallization is not a component of the already formed circuit traces (e.g., item 305, item 406, item 505, item 606). The Lin reference thus illustrates in particular the forming of a contacting area for a circuit trace and/or a chip-pad through a coating process (see also column 3, line 47ff). In this manner, a factual situation that deviates from the presently claimed subject matter is illustrated, and thus in our opinion is not transferable.

The Office Actions to date refer to column 6, lines 42-46, in the Lin reference, to a supposedly described cleaning. However, this relates to the cleaning of chip pads. In contrast to the presently claimed subject matter, this involves contact areas of an electric component, while according to the presently claimed subject matter the coating on the substrate formed in the shape of circuit traces is cleaned. This process in the Lin reference thus involves a completely different component than the one provided according to the presently claimed subject matter.

The Office Actions to date refers to a heat treatment in the Lin reference (column 4, lines 34-40). However, this exclusively involves a melting process to perform a soldering. In contrast, according to the presently claimed subject matter, a firing operation is provided, having significantly higher temperatures, in order to achieve a transformation, in terms of materials technology, of the coating material. It is only in this manner that it is possible to achieve a contacting ability for a subsequent contacting process (bonding). Moreover, in the Lin reference, a firing operation provided according to the presently claimed subject matter is not necessary, since the contacting is already formed by the coating process itself.

The Final Office Action refers to the Zuniga-Ortiz reference to conclusorily assert that silver is already known as a contacting material in chip pads, in particular in bonding processes. In contrast to the presently claimed subject matter, this involves contact areas of an electric component, these being bondable already even without additional methods (e.g., firing operation). Above all, in accordance with [0047], a blocking layer is also provided, which counteracts a diffusion.

In stark contrast, the presently claimed subject matter involves the forming of circuit traces, the coating with silver still not allowing a bondability. Rather, a transformation, in terms of materials technology, of the coating material through a subsequent firing operation is necessary, to achieve a contactability. In this context, for the transformation, in terms of materials technology, a free diffusion process is necessary. Thus, a direct transfer for the achievement of the subject matter of the presently claimed subject matter is not provided.

The Final Office Action conclusorily asserts that the Bayan reference (column 4, lines 38-50) provides that gold wires are suitable for a bond connection. According to the presently claimed subject matter, however, the circuit traces formed from a coating process have silver as a coating material, among others. However, these transform into an intermetallic phase through the firing operation provided according to the presently claimed subject matter, following diffusion processes, so that no more silver exists. A transfer to the subject matter according to the presently claimed subject matter is not provided, since as a consequence of different materials, it is not possible to assume the same bondability.

The Final Office Action refers to the Lin reference as to the application of silver, gold or silver compounds, and puts these in connection with LTCC technology. However, all references asserted by the Office Actions to date relate in their statements to contact areas of an electric component (chip) -- while the LTCC technology is applied to substrates. This is a totally different component. A direct transfer is not provided as to the presently claimed subject matter.

Still further, the Office Actions to date cite an unsupported chain of ideas of one skilled in the art, which supposedly leads from a layer construction of the Lin reference and the associated production method to a layer construction and a method to be used according to the presently claimed subject matter.

The Office Actions to date thus conclusorily assert that in the Lin reference, chips having silver pads may also be used. Additionally, reference is made to the fact that palladium is named as a possible coating material for the inner walls of the through-hole of the ceramic. Furthermore, starting from these considerations and the method of the Lin reference, a first coating (electroless depositing) of the inner walls of the through-hole of the ceramic would take place using the palladium. Additionally, a second coating for the contacting of the silver pad of the chip would take place using Ni-P or Cu.

A difference, however, may already be seen in the fact that according to the presently claimed subject matter, only one coating is provided, to wit, the depositing of palladium on silver. Additionally, a layer construction deviating from the presently claimed subject matter would result, as well. In accordance with the method of the Lin reference, the silver pad would not be directly connected to the palladium, but rather would have an additional intermediate layer of Ni-P or Cu.

Furthermore, the Office Actions to date conclusorily assert that the ceramic named as a substrate in the Lin reference could also be an LTCC through a related art that is mentioned in the present application. According to the Office Actions to date, it is to be inferred from this that the ceramic provided in the Lin reference could also have a metal film made out of silver. Even in the event that such a consideration is made, one skilled in the art

does not and could not arrive at the presently claimed subject matter for the following reasons:

A coating of the silver (first metal) with palladium (second metal) might take place, but a subsequent burning would not take place, as required according to the presently claimed subject matter, so as to form an intermetallic connection of the silver and the palladium. Indeed, the Office Actions to date explain that in the field of circuit trace technology the connecting of components through a burning is common. However, one skilled in the art would only consider the Lin reference if he were seeking a design approach for the contacting of a chip on a substrate.

In this context, the Lin reference indicates that an efficient electrical and mechanical connection between the chip and the substrate can be achieved in accordance with the described procedure. Therefore, even if an LTCC substrate having silver is provided and the inner walls of the through-holes of the substrate are coated, one skilled in the art would not provide an additional costly burning process, since the desired result of an optimal contacting may already be achieved without a costly burning process. Since the Lin reference provides no indications that the contacting may be improved by a burning, for example, one skilled in the art does not have a reason to deviate from the procedure of the Lin reference, as asserted by the Office.

Even if, contrary to expectations, one skilled in the art did consider a burning, he would further find out that after the burning process, he would obtain an intermetallic connection between the silver of the LTCC substrate and the palladium deposited on the silver. Since it is also always to be assumed that one skilled in the art is motivated to act efficiently, one skilled in the art would decide to revert right back to an LTCC having an AgPd coating. In this manner, the need for both the palladium-coating process and the burning process would be eliminated. Thus, one skilled in the art would not arrive at the method according to the presently claimed subject matter.

The following consideration also speaks to the novelty of the presently claimed subject matter. If it is assumed that with the knowledge of the Lin reference, the use of an already known LTCC substrate could be considered by one skilled in the art, it is then also generally known how a feedthrough normally takes place in an LTCC substrate. First

through-holes are punched in the substrate or pierced using a laser. Subsequently, the through-holes are filled in using a conductive paste, so as to thereby obtain the feedthrough. Then, chips on the underside of the LTCC substrate may be contacted in a simple manner, for example,

In stark contrast to this, the Lin reference concerns an approach that is significantly more costly for one skilled in the art, for arriving at the same result – namely, the contacting of a chip on a ceramic substrate. For this reason, one skilled in the art would not consider the Lin reference and thus also would not arrive at the presently claimed subject matter, as conclusorily and unsupportedly asserted by the Office Actions to date.

Ultimately, an important aspect of the presently claimed subject matter is to obtain an LTCC substrate having a usable assembly surface, for ICs or capacitors, for example. The LTCC substrates having a printed circuit trace of Ag are not suitable for such an assembly (Ag circuit traces corrode). A circuit trace of AgPd could indeed be printed, but would not survive the subsequent sinter process (adhesion problems).

The presently claimed subject matter thus illustrates a suitable design and approach for obtaining a usable assembly surface without an additional post-fire printing process. This is achieved in that Ag is used as a printed circuit trace for the LTCC substrate. Using only a galvanic process (seeding and coating of the Ag circuit traces with palladium) and subsequent burning at high temperatures, one obtains an intermetallic connection (AgPd) from this Ag circuit trace. This AgPd circuit trace then provides a bondable and adhesive surface, that we may use for the later assembly steps. These facts do not follow from any of the cited references mentioned.

It is also believed and respectfully submitted that the Lin and Djokic references do not disclose or suggest the feature of cleaning at least one coated surface, as provided for in the context of the presently claimed subject matter. In claims 1 and 11, a substrate is coated with a first metal, and that coated surface is cleaned. The Lin reference discusses terminal pads (reference item 402), but these terminal pads do not coat the integrated chip (which is distinct from a substrate). Rather, the terminal chips are themselves coated with a thin layer of nickel film which coats the rest of the integrated chip. (See Lin,

col. 6, lines 49-55). The coating by the layer of nickel film occurs after the integrated circuit has been cleaned. (See Lin, col. 6, lines 42-55). Therefore, even if Lin did refer to cleaning an integrated circuit, it does not disclose or suggest that a coated surface of the integrated circuit is cleaned.

Similarly, Djokic refers to cleaning a ceramic substrate, but it does not disclose or suggest a first metal coating the substrate. (See Djokic, col. 2, lines 30-35). The Djokic reference does not contain any disclosure that a coated surface of the substrate is cleaned, and it therefore does not disclose or suggest this subject matter.

The Zuniga-Ortiz and Bayan references and the purported Background Information do not disclose or suggest the cleaning of a coated surface, nor were any of these references asserted to do so. Therefore, these references do not disclose or suggest the feature of cleaning at least one coated surface.

For the foregoing reasons, claim 1, as presented, is allowable, as are its dependent claims 4 to 8 and 19 to 23.

Claim 11 includes features like those of claim 1, as presented, and it is therefore allowable for essentially the same reasons, as are its dependent claims 12 to 18 and 24.

The Final Office Action did not provide specific rejections as to claims 23 and 24.

As further regards all of the obviousness rejections, Official Notice was respectfully traversed since the Examiner has not provided, as requested, specific evidence to establish those assertions and/or contentions that may be supported by that Official Notices under 37 C.F.R. § 1.104(d)(2) or otherwise. In particular, the Examiner did not provide an affidavit and/or published information concerning these assertions, even though the § 103 rejections are apparently being based on assertions that draw on facts within the personal knowledge of the Examiner, since no support was provided for these otherwise conclusory and unsupported assertions. (See also MPEP § 2144.03).

As still further regards each of the obviousness rejections, it is respectfully submitted that the cases of In re Fine, *supra*, and In re Jones, 21 U.S.P.Q.2d 1941 (Fed. Cir. 1992), make plain that the Office's generalized assertions that it would have been obvious to modify or combine the references do not properly support a § 103 rejection. It is respectfully submitted that those cases make plain that the Answer reflects a subjective "obvious to try" standard, and therefore does not reflect the proper evidence to support an obviousness rejection based on the references relied upon. In particular, the Court in the case of In re Fine stated that:

The PTO has the burden under section 103 to establish a *prima facie* case of obviousness. It can satisfy this burden only by showing some objective teaching in the prior art or that knowledge generally available to one of ordinary skill in the art would lead that individual to combine the relevant teachings of the references. This it has not done. . . .

Instead, the Examiner relies on hindsight in reaching his obviousness determination. . . . One cannot use hindsight reconstruction to pick and choose among isolated disclosures in the prior art to deprecate the claimed invention.

In re Fine, 5 U.S.P.Q.2d at 1598 to 1600 (citations omitted; italics in original; emphasis added). Likewise, the Court in the case of In re Jones stated that:

Before the PTO may combine the disclosures of two or more prior art references in order to establish *prima facie* obviousness, there must be some suggestion for doing so, found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. . . .

Conspicuously missing from this record is any evidence, other than the PTO's speculation (if it be called evidence) that one of ordinary skill . . . would have been motivated to make the modifications . . . necessary to arrive at the claimed [invention].

In re Jones, 21 U.S.P.Q.2d at 1943, 1944 (citations omitted; italics in original).

That is exactly the case here since it is believed and respectfully submitted that the Office Actions to date offer no evidence whatsoever, but only conclusory hindsight, reconstruction and speculation, which these cases have indicated does not constitute evidence that will support a proper obviousness finding. Unsupported assertions are not evidence as to

why a person having ordinary skill in the art would be motivated to modify or combine references to provide the claimed subject matter of the claims to address the problems met thereby. Accordingly, the Office must provide proper evidence of a motivation for modifying or combining the references to provide the claimed subject matter.

Also, the Federal Circuit in the case of In re Kotzab has made plain that even if a claim concerns a “technologically simple concept” — which is not the case here — there still must be some finding as to the “specific understanding or principle within the knowledge of a skilled artisan” that would motivate a person having no knowledge of the claimed subject matter to “make the combination in the manner claimed,” stating that:

In this case, the Examiner and the Board fell into the hindsight trap. The idea of a single sensor controlling multiple valves, as opposed to multiple sensors controlling multiple valves, is a technologically simple concept. With this simple concept in mind, the Patent and Trademark Office found prior art statements that in the abstract appeared to suggest the claimed limitation. But, there was no finding as to the specific understanding or principle within the knowledge of a skilled artisan that would have motivated one with no knowledge of Kotzab's invention to make the combination in the manner claimed. In light of our holding of the absence of a motivation to combine the teachings in Evans, we conclude that the Board did not make out a proper prima facie case of obviousness in rejecting [the] claims . . . under 35 U.S.C. Section 103(a) over Evans.

In re Kotzab, 55 U.S.P.Q.2d 1313, 1318 (Fed. Cir. 2000) (emphasis added). Here again, there have been no such findings to establish that the features discussed above of the rejected claims are met by the reference relied upon. As referred to above, any review of the reference, whether taken alone or combined, makes plain that the reference simply does not describe the features discussed above of the rejected claims.

Thus, the proper evidence of obviousness must show why there is a suggestion as to the reference so as to provide the subject matter of the claimed subject matter and its benefits.

In short, there is no evidence that the reference relied upon, whether taken alone or otherwise, would provide the features of the claims discussed above. It is therefore respectfully submitted that the claims are allowable for these reasons.

As still further regards all of the obviousness rejections of the claims, it is respectfully submitted that a proper *prima facie* case has not been made in the present case for

obviousness, since the Office Actions to date never made any findings, such as, for example, regarding in any way whatsoever what a person having ordinary skill in the art would have been at the time the claimed subject matter of the present application was made. (See *In re Rouffet*, 47 U.S.P.Q.2d 1453, 1455 (Fed. Cir. 1998) (the “factual predicates underlying” a *prima facie* “obviousness determination include the scope and content of the prior art, the differences between the prior art and the claimed invention, and the level of ordinary skill in the art”)). It is respectfully submitted that the proper test for showing obviousness is what the “combined teachings, knowledge of one of ordinary skill in the art, and the nature of the problem to be solved as a whole would have suggested to those of ordinary skill in the art”, and that the Patent Office must provide particular findings in this regard — the evidence for which does not include “broad conclusory statements standing alone”. (See *In re Kotzab*, 55 U.S.P.Q. 2d 1313, 1317 (Fed. Cir. 2000) (citing *In re Dembiczak*, 50 U.S.P.Q.2d 1614, 1618 (Fed. Cir. 1999) (obviousness rejections reversed where no findings were made “concerning the identification of the relevant art”, the “level of ordinary skill in the art” or “the nature of the problem to be solved”))). It is respectfully submitted that there has been no such showings by the Office Actions to date or by the Advisory Action.

In fact, the present lack of any of the required factual findings forces both Appellants and any Appeals Board to resort to unwarranted speculation to ascertain exactly what facts underly the present obviousness rejections. The law mandates that the allocation of the proof burdens requires that the Patent Office provide the factual basis for rejecting a patent application under 35 U.S.C. § 103. (See *In re Piasecki*, 745 F.2d 1468, 1472, 223 U.S.P.Q. 785, 788 (Fed. Cir. 1984) (citing *In re Warner*, 379 F.2d 1011, 1016, 154 U.S.P.Q. 173, 177 (C.C.P.A. 1967))). In short, the Examiner bears the initial burden of presenting a proper *prima facie* unpatentability case — which has not been met in the present case. (See *In re Oetiker*, 977 F.2d 1443, 1445, 24, U.S.P.Q.2d 1443, 1444 (Fed. Cir. 1992)).

Accordingly, claims 1, 4 to 8 and 11 to 24 are allowable.

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CONCLUSION

In view of the above, it is respectfully submitted that all of the presently pending claims 1, 4 to 8 and 11 to 24 are allowable. It is therefore respectfully requested that the rejections (and any objections) be withdrawn. Since all issues raised by the Examiner have been addressed, an early and favorable action on the merits is respectfully requested.

Respectfully submitted,

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